

ABSTRACT

Gin operating costs in the Midsouth were analyzed for 1970/71 and 1971/72 on the basis of a sample of 48 plants representing over 8 percent of the total ginning capacity of the region. Although average capacity utilization of the sample gins increased from 56 percent in 1970/71 to 59 percent in 1971/72, average total cost per bale also increased--from \$18.51 to \$18.54. When adjustments were made for the differences in volumes ginned, the cost increase for 1971/72 was \$0.30, compared with a \$1.28 increase during the 1970/71 season. All per bale overhead costs were down slightly in 1971/72, and labor costs were down significantly due to increased volumes. Other variable costs, except miscellaneous, rose as a result of general price increases.

Key Words: Cotton ginning, capacity, utilization, rates, costs.

ACKNOWLEDGMENT

Dale L. Shaw, Agricultural Economist at the Tucson, Ariz., office of the Commodity Economics Division, Economic Research Service, developed the computer program for this study and initiated the computer runs.

COTTON GIN OPERATING COSTS IN THE MIDSOUTH--

1970/71 AND 1971/72

by

Zolon M. Looney, Joseph L. Ghetti, and
Shelby H. Holder, Jr.

Agricultural Economists, Commodity Economics Division
Economic Research Service

INTRODUCTION

This is the third annual report analyzing cotton gin operating costs in the Midsouth. 1/ Average costs and volumes ginned in the 1970/71 season are compared with costs and volumes in 1971/72. The study is similar to those conducted by the Economic Research Service (ERS) in several areas of Texas and California.

The Delta counties of Arkansas, Louisiana, Mississippi, and Missouri comprise the Midsouth area. Except for the omission of a few counties in northwestern Louisiana, the Midsouth is the region defined as the Mississippi Delta in ERS cotton production cost studies. 2/ Gins were classified by rated capacity of bales per hour and stratified into four size groups. A random sample was selected from each group in proportion to the total capacity of the group. The sample is revised annually by additions and deletions to reflect changes in the capacity of all gins in the area. Forty-eight plants, representing approximately 8 percent of the total ginning capacity of the region, comprise the sample.

FINDINGS

Volume Ginned

Number of bales ginned varied widely among gins within each size group (table 1). The overall range was 997 to 17,116 bales in 1971/72 and 916 to 8,577 bales in 1970/71. In each season, the smallest plants (group 1) averaged 2,264 bales and the largest plants (group 4), about 8,725 bales.

1/ See appendix for a listing of other reports.

2/ Starbird, I. R., and Mines, F. K. Costs of Producing Upland Cotton in the United States, 1964. U.S. Dept. Agr., Econ. Rpt. No. 99, Sept. 1966.

Table 1.--Rated hourly capacities, volumes ginned, and capacity utilization, by ranges and averages for sample gin plants and estimates for all gins, Midsouth region, 1971/72 and 1970/71

Gin group and season		Rated hourly capacity 1/		Annual volume ginned		Rate of capacity utilization 2/		
	Gins in--	Sample	Uni-verse	Sample	Uni-verse	Sample	Uni-verse	
Sample: Uni-verse	Range : Average:average:	Range	Average:average:	Range	Average:average:	Range	Average:average:	
- Number -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	
							Percent - - - - -	
1971/72:								
Group 1.....	10	247	5- 6	5.5	997- 3,829	2,264	--	
Group 2.....	13	235	7- 8	7.3	1,005- 6,269	3,692	--	
Group 3.....	12	141	9-15	11.7	1,917-14,271	5,224	--	
Group 4.....	13	89	16-36	19.6	4,556-17,116	8,725	--	
Combined sample 3/	48	--	5-36	--	997-17,116	--	4,129	
Universe 4/.....	--	712	--	--	9.0	--	3,766	
							19-185	
							--	
							59	
							54	
1970/71:								
Group 1.....	12	266	5- 6	5.5	916- 4,287	2,264	--	
Group 2.....	15	242	7- 8	7.2	1,385- 6,011	3,395	--	
Group 3.....	12	144	9-15	11.8	2,540-11,833	4,836	--	
Group 4.....	9	71	16-36	21.0	18.9	2,728-18,577	8,726	--
Combined sample 3/	48	--	5-36	--	8.8	916-18,577	--	
Universe 4/.....	--	723	--	--	8.6	--	3,799	
							20-154	
							--	
							3,256	
							--	
							49	

-- = Not applicable.

1/ Based on observations in plants operating under normal conditions. Variations in group averages between seasons were due to adjustments in sample resulting from changes in plant population.

2/ Ratio of volume ginned to estimated total seasonal ginning capacity without seed cotton storage. Based on typical ginning season of 906 operating hours and a sustained seasonal capability estimated at 85 percent of rated hourly capacities.

3/ Combined sample and the group averages expanded to the universe.

4/ Based on number of gins operating in the study area and actual production during the respective ginning seasons.

Based on ginning distributions reported by the Bureau of the Census, it is estimated that gins can operate up to 906 hours during a normal ginning season. ^{3/} Multiplying the product of 906 hours and rated hourly capacity by ⁸⁵⁻ percent efficiency gives the rated annual capacity for each size gin plant. ^{4/} Due to variations in local conditions or unusual circumstances, individual plants can sometimes exceed these indicated annual peak volumes. Four sample plants exceeded their rated annual capacities in 1971/72, compared with three in 1970/71. In 1971/72, the average seasonal volume ranged from 53 percent of capacity for group 1 to 66 percent for group 2. The overall sample average capacity utilization was 59 percent. In 1970/71, the range was smaller-- 53 to 61 percent--with an overall average of 56 percent.

Average capacity of the 712 plants active in the area during 1971/72 was 9.0 bales per hour, up from 8.6 bales per hour for the 723 plants active in 1970/71. Even with a decrease of 11 active gins, total hourly capacity was approximately 6,408 bales in 1971/72 compared with about 6,218 the year before. Thus, total hourly capacity for all gins in the area had increased nearly 200 bales in 1 year. A similar increase in total hourly capacity had occurred during the previous 2-year period.

Average Cost

Average book costs and replacement costs are shown for each size group and for all groups combined (tables 2 and 3). ^{5/} Book costs were taken directly from gin records, with only minor adjustments made to limit costs to those actually incurred in ginning. Replacement costs differ from book costs for only two items--depreciation and interest. Because of wide differences among gins in depreciation schedules used and interest actually paid, uniform rates for each were adopted. Depreciation was set at 7 percent of investment in buildings and equipment, based on 1970 replacement costs. Interest was allowed at 8 percent on half of this replacement cost and on the total estimated land value.

Per bale costs for individual items varied widely within groups, mainly because of the broad range of volumes ginned. Average unit costs generally tended to become lower as gin size and volume increased. However, even with greater volumes in 1971/72, costs were about the same as in the previous year, if not a little higher. Average ginning costs for group 2 were lower than for groups 3 and 4 in both years. This apparent discrepancy--the two groups of larger plants having higher costs than group 2--was due to the appreciably higher capacity utilization of gins in group 2 than those in the larger groups. In 1971/72, average sample gin costs per bale ranged from \$19.88 for group 1 to \$17.76 for group 2, and in 1970/71, from \$19.90 to \$17.55. These costs averaged \$18.54 in 1971/72 and \$18.51 in 1970/71.

^{3/} Assuming no seed cotton storage, other than normal trailer storage, to extend the ginning season.

^{4/} Looney, Zolon M., and Wilmot, Charles A. Economic Model for Cotton Ginning. U.S. Dept. Agr., Agr. Econ. Rpt. No. 214, Oct., 1971.

^{5/} For definition of terms, allocation of costs, and cost adjustments, see appendix.

Table 2--Ginning costs per bale, sample groups 1-4 and weighted averages for gin universe, midsouth region, 1971/72 1/

Cost item 2/ 4	Group 1		Group 2		Group 3		Group 4		Weighted average: 3/ 5
	Range	Average	Range	Average	Range	Average	Range	Average	
<u>Dollars</u>									
Management.....	1.02- 3.40	2.24	1.13- 4.87	2.09	1.19- 5.61	2.08	.85- 4.02	1.35	1.92
Insurance.....	.26- 1.57	.68	.28- 1.90	.65	.18- 1.09	.50	.14- .80	.36	.54
Taxes.....	.14- .91	.36	.13- 1.40	.37	.09- .81	.26	.01- .69	.30	.32
Energy.....	.83- 3.31	1.86	1.11- 2.66	1.53	.70- 3.09	1.65	.108- 2.38	1.74	1.68
Labor.....	3.19- 9.83	4.50	2.54- 6.12	3.73	2.16- 6.41	3.56	2.72- 5.32	3.58	3.79
Bagging and ties.....	2.28- 3.71	3.37	2.92- 3.89	3.46	3.13- 3.75	3.42	3.25- 3.70	3.46	3.43
Repairs.....	1.19- 8.04	3.10	1.41- 4.14	2.27	1.82- 2.87	3.03	1.55- 6.07	2.53	2.69
Miscellaneous.....	.95- 2.70	1.38	.40- 2.36	1.08	.46- 2.18	1.20	.47- 2.44	1.07	1.17
Out-of-pocket subtotal 4/:	14.07-25.68	17.49	12.07-21.91	15.17	12.70-25.30	15.70	12.00-21.15	14.38	15.54
Depreciation.....	.67- 4.58	1.89	.21-11.26	1.95	.63- 6.58	2.39	2.21- 7.75	3.37	2.42
Interest.....	0.00- 3.78	.49	0.00- 2.62	.64	0.00- 1.36	.54	0.00- 2.30	.62	.58
Total.....	15.63-33.22	19.86	13.83-35.81	17.76	14.36-32.59	18.64	14.56-24.18	18.37	18.54
Replacement depreciation 5/:	3.82-15.73	6.69	2.67-16.65	4.60	1.47-12.05	4.37	2.69- 6.33	4.03	4.79
Replacement interest 5/:	2.43- 9.95	4.25	11.68-10.47	2.89	.92- 7.47	2.71	1.65- 3.90	2.47	2.99
Total replacement 6/:	20.33-51.36	28.44	16.41-44.31	22.66	15.57-44.82	22.73	16.77-29.92	20.88	23.33

Individual items may not add to the total because of rounding.

1/ Group 1-rated capacity of 6 bales per hour or less; group 2-7 and 8 bales per hour; group 3-9 through 15 bales per hour; group 4-16 through 36 bales per hour. The universe includes all gins in the study area.

2/ Taken from gin records and subjected to uniform allocation procedures.

3/ Sample average across groups, weighted by each group's representative proportion of the total rated ginning capacity in the study area gin universe.

4/ Sample gin costs excluding depreciation and interest.

5/ Depreciation at 7 percent, based on 1970 replacement costs; interest at 8 percent on land value and on half the 1970 replacement cost.

6/ Out-of-pocket costs plus replacement depreciation and interest costs.

Table 3--Ginning costs per bale, sample groups 1-4 and weighted averages for gin universe, Midsouth region, 1970/71 1/

Cost item 2/	Group 1		Group 2		Group 3		Group 4		Weighted average 3/
	Range	Average	Range	Average	Range	Average	Range	Average	
Dollars									
Management.....	0.53- 6.27	2.47	0.71- 5.30	2.12	1.14- 3.85	2.03	0.84- 3.04	1.19	1.96
Insurance.....	.14- 1.37	.60	.30- 1.81	.66	.22- 1.21	.51	.16- .86	.39	.55
Taxes.....	.14- 1.90	.49	.14- 1.18	.38	.12- .74	.29	.01- .53	.27	.36
Energy.....	.61- 3.25	1.88	.66- 2.58	1.38	.83- 2.58	1.56	1.34- 2.61	1.79	1.62
Labor.....	2.60- 8.59	4.97	1.70- 5.92	3.86	1.87- 9.19	3.65	1.39- 6.24	3.33	3.94
Bagging and ties.....	2.67- 3.64	3.04	2.01- 4.72	3.10	3.09- 4.77	3.29	3.03- 3.53	3.19	3.15
Repairs.....	1.12- 4.04	2.28	.45- 5.05	2.15	1.50- 6.17	2.94	1.52- 5.15	2.53	2.46
Miscellaneous.....	.41- 4.48	1.62	.20- 1.76	1.05	.29- 3.23	1.29	.39- 3.31	1.04	1.24
Out-of-pocket subtotal 4/	9.67-27.25	17.35	7.68-22.96	14.70	11.91-24.59	15.56	9.79-21.72	13.73	15.31
Depreciation.....	.66- 3.66	2.05	.41-10.06	2.19	1.35- 5.31	2.77	2.26- 6.30	3.46	2.57
Interest.....	0.00- 3.99	.49	0.00- 2.86	.66	0.00- 2.18	.63	0.00- 2.79	.69	.62
Total.....	12.40-33.10	19.90	12.27-35.88	17.55	14.84-30.51	18.97	12.80-26.01	17.88	18.51
Replacement depreciation 5/	3.41-17.12	6.70	2.78-12.84	4.99	1.77- 9.09	4.71	3.65-10.55	4.32	5.16
Replacement interest 5/.....	2.71-10.83	4.25	1.75- 8.03	3.13	1.11- 5.64	2.92	2.21- 6.50	2.65	3.23
Total replacement 6/.....	15.26-55.20	28.30	13.88-43.83	22.82	15.70-39.32	23.19	15.81-38.76	20.70	23.71

Individual items may not add to the total because of rounding.

1/ Group 1-rated capacity of 6 bales per hour or less; group 2--7 and 8 bales per hour; group 3--9 through 15 bales per hour; group 4--16 through 36 bales per hour. The universe includes all gins in the study area.

2/ Taken from gin records and subjected to uniform allocation procedures.

3/ Sample average across groups, weighted by each group's representative proportion of the total rated hourly ginning capacity in the study area gin universe.

4/ Sample gin cost excluding depreciation and interest.

5/ Depreciation at 7 percent, based on 1970 replacement costs; interest at 8 percent on land value and on half the 1970 replacement cost.

6/ Out-of-pocket costs plus replacement depreciation and interest costs.

Ginning costs are increasing. Even after adjustments were made for differences in volumes ginned, the total cost per bale was \$0.30 more in 1971/72 than in 1970/71, compared with a previous increase of \$1.28 from 1969/70. When allowances are made for depreciation and interest, based on 1970 replacement cost of building and equipment, these increases were \$0.20 and \$1.46 per bale for the 2 respective years.

Charging depreciation and interest on a replacement basis resulted in higher costs for all gins, although the increase was much more pronounced for the smaller plants. Larger plants, because they tend to be newer, already have higher book depreciation and interest costs based on more recent installation costs.

To illustrate the adverse effects of inadequate volumes on ginning costs, adjustments were made to 70 percent of capacity utilization and averages shown for each group (table 4). Spreading such costs as management and office labor, depreciation, interest, insurance, and taxes over more bales obviously reduces total ginning costs per bale markedly. Greater ginning volumes may also reduce per bale costs of such variable items as labor and energy. Ginning at the same relative volume results in lower costs as gin size is increased, reflecting economies of scale which exist among the sizes of gins studied. 6/

Table 4--Estimated gin costs per bale at 70-percent capacity utilization, sample groups 1-4 and weighted averages for universe, Midsouth region, 1971/72 and 1970/71^{1/}

Cost item 2/ 1	1971/72			1970/71									
	Group 1	Group 2	Group 3	Group 4	Weighted average 3/ 2/	Group 1	Group 2	Group 3	Group 4	Group 4	Group 3	Group 2	Group 1
- - - - - Dollars - - - - -													
Management.....	1.83	2.31	1.94	1.20	1.69	1.99	1.87	1.69	1.03	1.67	.33	.47	
Insurance.....	.55	.62	.44	.32	.48	.59	.60	.43	.21	.29	.21	.21	
Taxes.....	.27	.35	.22	.25	.27	.37	.33	.22	.145	.145	.145	.145	
Energy.....	1.67	1.50	1.54	1.62	1.58	1.74	1.31	1.45	.64	.52	.64	.52	
Labor.....	4.01	3.64	3.30	3.30	3.54	4.41	3.61	3.16	.93	.54	.93	.54	
Bagging and ties.....	3.37	3.46	3.42	3.46	3.42	3.04	3.10	3.29	3.19	3.15	3.19	3.15	
Repairs.....	2.77	2.22	2.34	2.37	2.54	2.33	2.27	2.98	2.58	2.54	2.58	2.54	
Miscellaneous.....	1.31	1.08	1.15	1.04	1.14	1.81	1.04	1.38	1.11	1.33	1.11	1.33	
Out-of-pocket subtotal 4/...	15.80	14.89	14.76	13.56	14.67	16.19	14.12	14.60	13.07	14.50			
Depreciation.....	1.45	1.64	1.59	2.78	2.04	1.57	1.92	2.12	2.67	2.05			
Interest.....	.38	.61	.45	.51	.49	.38	.58	.49	.53	.50			
Total.....	17.62	17.34	17.20	16.85	17.21	18.14	16.61	17.20	16.27	17.05			
Replacement depreciation 5/...	5.11	4.35	3.63	3.32	4.06	5.11	4.37	3.61	3.33	4.12			
Replacement interest 5/...	3.25	2.73	2.25	2.04	2.53	3.25	2.74	2.24	2.04	2.50			
Total replacement 6/.....	24.16	21.98	20.64	18.92	21.26	24.55	21.23	20.44	18.44	21.20			
Bales.....	2,964	3,897	6,288	10,573	4,840	2,964	3,881	6,378	11,319	4,630			

Individual items may not add to the total because of rounding. 1/ Group 1-rated capacity of 6 bales per hour or less; group 2-7 and 8 bales per hour; group 3-9 through 15 bales per hour; group 4-16 through 36 bales per hour.

The universe includes all gins in the study area. 2/ Taken from gin records subjected to uniform allocation procedures. 3/ Sample average across groups, weighted by each group's representative proportion of the total rated hourly ginning capacity in the study area Gin universe. 4/ Sample gin cost excluding depreciation and interest.

5/ Depreciation at 7 percent, based on 1970 replacement costs; interest at 8 percent on land value and on half the 1970 replacement cost. 6/ Out-of-pocket costs plus replacement depreciation and interest costs.

APPENDIX

Gins vary widely by type of organization, ownership structure, accounting procedures, and in many other ways. In analyzing costs reported by sample gins, uniform allocation procedures were employed to compensate for some of these differences. Costs of hauling cottonseed and lint, such as truck drivers' wages, truck depreciation, insurance, road-use taxes, and associated truck-operating costs, were excluded.

Cost Allocations

Management: Where applicable, includes salaries, bonuses, commissions, expense allowance, house rent, and personal insurance policies for owners and managers, bookkeeping and other office salaries and home office cost (line companies); and social security taxes, workmen's compensation insurance, and any other insurance on management and office personnel.

Depreciation: Allowances for depreciation exactly as carried on gin records.
(See Replacement Costs below.)

Interest: Interest exactly as carried on gin records. (See Replacement Costs below.)

Insurance: All forms of insurance on gin buildings, equipment, housing furnished management and labor, cotton products, and automotive equipment (except large trucks and trailers).

Taxes: All taxes on real property only.

Energy: All utilities--electricity, gas, and water--used in ginning and directly related operations.

Labor: Gin wages, social security, workmen's compensation, and other insurance on gin labor borne by the gin and expense related to any rental housing furnished labor. (Excludes gin repair labor; see Repairs below.)

Bagging and ties: Actual cost of bagging and ties purchased.

Repairs: Gin repair wages; social security, workmen's compensation, and other insurance on gin repair labor borne by the gin; and cost of repair materials and supplies.

Miscellaneous: Combined car and pickup, tractor, and other automotive expense; telephone and telegraph; advertising and promotion; legal and audit, dues (except National Cotton Council dues), memberships, and subscriptions; annual meetings and directors' fees and expenses; conventions and travel expenses; donations and contributions; cotton losses from fire; sampling, compressing, and related charges; gin supplies; and any other costs not included elsewhere.

Costing Methods

Sample gin costs: Gin costs which have been subjected to the above allocations are identified in this report as sample gin costs.

Out-of-pocket costs: Sample gin costs from which depreciation and interest have been excluded.

Replacement costs: Out-of-pocket costs plus depreciation at 7 percent computed on 1970 replacement values on gin plants and interest at 8 percent on land value and on half the 1970 replacement cost of machinery, equipment, and buildings.

Cost Adjustments

Estimates of ginning costs at other than existing levels of capacity utilization were based on relationships assumed in the synthetic development of a series of model gins. 7/

Weighting

In computing weighted averages, the simple weighted average cost per bale for each group was further weighted by its representative proportion of the total rated hourly ginning capacity in the area. This was done to reflect more accurately the cost of ginning an "average" bale of cotton in the Midsouth.

Related Reports

1. Looney, Zolon M., and Shaw, Dale L., Cotton Gin Operating Costs in the Midsouth, 1968-69 and 1969-70, U.S. Dept. Agr., Econ. Res. Serv., Mktg. Res. Rpt. No. 942, Dec. 1971.

2. Looney, Zolon M., Holder, Jr. Shelby H., and Ghetti, Joseph L. Cotton Gin Operating Costs in the Midsouth--1969-70 and 1970-71 Seasons, U.S. Dept. Agr., Econ. Res. Serv., Mktg. Res. Rpt. No. 964, June 1972.